DOCUMENT RESUME

ED 179 100 FL 010 734

AUTHOR Wootten, Janet: And Others
TITLE "Wh"-Questions: Linguistic Evidence tc Explain the Sequence of Acquisition.
SPONS AGENCY National Inst. of Child Health and Human Development (NIH), Bethesda, Md.: National Science Foundation, Washington, D.C.
PUB DATE 16 Mar 79
NOTE 22p.: Paper presented at the Biennial Meeting of the Society for Research in Child Develcpment (San Francisco, CA, March 16, 1979)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Child Language: Ccgnitive Development: Discourse Analysis: *Infants: *Language Development: *Language Processing: Language Research: *Questicning Techniques: Syntax: Verbs
IDENTIFIERS *Questions

ABSTRACT

The use of "wh" fcrms in questions asked by four children was recorded from age 22 to 36 months, and analyzed. In the emergence of "wh" forms, the children first asked identifying questions with "what" and "who," followed in order by (1) "wh" pronominal questions which ask for major sentence constituents: (2) the "wh" sententials "how," "why," and "when": and (3) the "wh" adjectivals "which" and "whose." "What" and "where" questions accounted for most of the questions with verbs until 34 months. "Why" questions with verbs began to supplement "where," "how," and "who" questions at 36 months. "What," "where," and "who" questions occurred most often with the copula or pro-verbs: most "why," "which," and "when" questions occurred with descriptive verbs: and "how" questions were evenly divided between the two categories. Later-emerging "wh" forms were used with a greater variety of verbs than earlier forms, in a pattern that suggests the involvement of both the syntactic function of individual "wh" fcrms and the semantics of descriptive verbs. Finally, the use of ellipsis in forming "wh" questions emerged with the development of the capacity to formulate ccntingent queries for further information. (JB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED179100

Wh-Questions: Linguistic Evidence to Explain the Sequence of Acquisition

Janet Wootten, Susan Merkin, Lois Hood, and Lois Bloom
Teachers College, Columbia University

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Janet Wootten

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PL010734

Note. Paper presented to the Biennial Meeting of the Society for Research in Child Development, San Francisco, California, March 16, 1979. We thank Jane Monroe and Karin Lifter for their help with the statistical analyses. The research reported here was supported by Research Grants from the National Science Foundation and the National Institutes of Health.

Wh-Questions: Linguistic Evidence to Explain the Sequence of Acquisition

Janet Wootten, Susan Merkin, Lois Hood, and Lois Bloom
Teachers College, Columbia University

The sequence of acquisition of wh-question forms has been explained most often in the child language literature as resulting from constraints on children's cognitive development (e.g., Smith, 1933; Brown, 1968; Ervin-Tripp, 1970; and Tyack and Ingram, 1977). That is, why and when questions, which are acquired late in the sequence, refer to more abstract and less tangible ideas than do what and where questions, which are learned early on. It is becoming clear, however, that this explanation is no longer sufficient. Recent studies of second language acquisition (e.g., Lightbown, 1978; Felix, 1976) have shown that older children learning to speak a second language produce questions in the same developmental sequence as when learning their first language at an earlier age. There are also experimental tasks of children's comprehension of questions (Ervin-Tripp, 1970; Tyack and Ingram, 1977) in which the structure of questions and the transitivity of the verbs in questions influenced performance. In addition, then, to whatever cognitive constraints and whatever motivational and functional factors contribute to this developmental sequence, there are evidently important linguistic constraints operating as well.

This study explored three possible sources of linguistic constraints on how children learn to ask wh-questions, namely: (1) those that operate with respect to the syntactic function of the wh-form, (2) those that operate in the selection of verbs in wh-questions, and (3) those associated with the discourse function of the particular question form. Our results confirmed that all three kinds of linguistic

constraints operate in complex interaction to determine order of acquisition of wh-forms. Specifically, we found that verbs of varying semantic complexity were distributed selectively among different question forms, that this distribution was related to the syntactic function of the wh-form itself, and that, with respect to discourse constraints, both the semantic constraints imposed by the verb, and the syntactic constraints imposed by the question form, determined the relative amount of verb ellipsis that occurred.

Our research is based upon transcribed audiotapes of four children, Eric, Gia, Kathryn, and Peter, who were observed longitudinally from age 22 to 36 months in informal home sessions. Within these sessions, the children asked a total of 5,315 wh-questions which were analyzed according to wh-form, occurrence and type of verb with each wh-form, and the incidence of verb ellipsis among different question forms. The results reported on here help to explain the order in which the wh-forms were acquired, and also make clear that verb ellipsis is a discourse device that is learned over the same period of time.

To begin with, the children in this study learned to ask wh-questions in essentially the same sequence as has been reported in other studies in the literature. Our analyses distinguished two sequences of wh-form emergence: a sequence for wh-questions overall, and a sequence for wh-questions with verbs. Questions with verbs comprised 75% of all wh-questions. Of the remaining 25% without verbs, there were the single word "what?," the elliptical "what book?," or the incomplete "what that?" Both orders of emergence with respect to average age, and average rank (which reflects the relative frequency

of different wh-forms) are displayed in Figure 1. The sequence of

---

Insert Figure 1 about here

---

acquisition for wh-questions overall (as shown in upper case letters) was what and where, followed by how, who, which, and why. The order of emergence for wh-forms with verbs, shown in lower case, was what and where, followed by who, how, and why. The two orders of acquisition were quite similar, except that how forms emerged with verbs several months after they first appeared in questions such as "How 'bout this?" Who-forms overall were relatively more frequent than who-forms with verbs, and this is reflected in the difference in their respective ranks. Which-questions rarely occurred with verbs, even by age 36 months. Although why-forms with verbs emerged later than why-forms overall, it was not the case, as observed by Labov (1976) and Felix (1977), that production of single-word why-questions preceded multi-word why-constructions.

The major results of the study include (1) the syntactic function of the wh-form, (2) the relative distribution of wh-forms with verbs, (3) the selective distribution of different categories of verbs with different wh-forms, (4) the relative number of different verbs used with each wh-form, (5) the progression in the use of different verbs over time, and (6) the distribution of verb ellipsis among different wh-forms.

Syntactic Function of Wh-forms

It is apparent that the syntactic function of wh-forms is an important linguistic constraint on sequence of acquisition. Specifi-

cally, what, where, and who are wh-pronominals that ask for the major sentence constituents that they replace. As such, they are relatively simple syntactically and were the first wh-forms to emerge with verbs. In contrast, why, how, and when, which emerged later, are wh-sententials, which do not replace major sentence constituents, but ask for information that pertains to the semantic relations among all the constituents in a sentence. Which and whose are adjectival wh-forms; they were used rarely and neither form emerged with verbs over the course of the study. The sequence in which the wh-forms were acquired in part reflects the relative syntactic complexity among different wh-forms, in that pronominal forms what and where were learned before the sentential forms why, how, and when, which were learned before the adjectival forms which and whose. Our classification thus far, however, is not sufficiently sensitive to account for the finding that who, which was also a pronominal form, was learned several months after the other pronominal forms what and where (although who was still learned before how and why).

We hypothesized that perhaps when wh-pronominals are first learned, what and who do not ask for sentence constituents but ask instead for identities. That is, they ask for the names of objects and the names of persons as in the questions "what's this?" and "who's that?" These identifying questions are clearly different from those which ask for a major sentence constituent as in "what's the doggie eating?" or "who breaked that?" We found that early on, what-questions overwhelmingly functioned as identifying questions, and only much later asked for particular sentence constituents. When who-questions first appeared, however, they were of both functional types. That is, they asked for both identities and subject constituents; although they more fre-

quently asked for constituents. Nevertheless, identifying who-questions did not emerge along with identifying what and where questions. This can be explained, in part, by the fact that there are many more objects than there are people whose identity a young child might question. In fact, this language corpus was collected in the home, where the child might have had relatively little occasion to ask the identity of persons.

Overall, then, the order of emergence of wh-forms is one in which the child asks identifying questions (first with what and later with who), followed by wh-pronominal questions which ask for major sentence constituents. Later the child acquires the wh-sententials how, why, and when, and still later learns to ask questions with wh-adjectivals which and whose.

Distribution of Wh-forms with Verbs

The next analyses were concerned specifically with relations between wh-questions and verbs. The developmental distribution of the different kinds of wh-questions that occurred with verbs is presented in Figure 2.

Insert Figure 2 about here

As can be seen, what and where questions accounted for most of the questions with verbs until age 34 months. The decline in the relative frequency of where, how, and who questions coincided with the emergence of why questions with verbs, which became more frequent than where, how, and who questions combined by age 36 months.

Selective Distribution of Verbs with Wh-forms

Questions with verbs included questions with the contracted and uncontracted copula as well as the pro-verbs do and go, which were the most frequent verbs that the children used besides the copula. All other verbs besides the copula, do, and go were descriptive verbs that named specific actions and states, such as "eat," "throw," "break," "sleep," etc. The wh-forms differed according to the frequencies with which they were used with either descriptive verbs, or the copula and pro-verb forms. The selective distribution of different verbs with the different wh-forms is presented in Table 1, for the four children combined, and for all the questions that occurred in the children's speech from 22 to 36 months.

Insert Table 1 about here

As can be seen, what, where and who-questions occurred most often with the copula or pro-verbs. How-questions had a near-equal distribution in both verb categories. In contrast, almost three-quarters of the why-questions occurred with descriptive verbs, and which and when-questions, when they did occur, also were used predominately with descriptive verbs. This finding complements the description of the order of emergence of the wh-forms, in that those wh-forms that were pronominal constituents (what, where and who) emerged first in the children's questions with verbs and were also those forms which occurred predominately with pro-verbs; whereas, the later-emerging wh-forms that were sentential forms (how, why, and when), tended to be used with descriptive verbs primarily. These results provide evidence of a developmental interaction between the

complexity of the syntactic function of a particular wh-form and the semantic complexity of the verb used with that form.

The Relative Number of Different Verbs Used with Different Forms

Our next task became the teasing apart of those factors which contributed to this pattern of emergence, in particular the frequency and variety of the verbs that occurred. We knew that certain wh-forms were acquired before others; that the relative frequency of a particular question form changed over time; and that later learned forms emerged with descriptive verbs. It also appeared that some question forms occurred with many more different verbs than others. Our hypothesis was that the order of acquisition of wh-forms and the kind and variety of verbs that occurred with them were covarying factors. A measure of this covariation was the relationship between the relative number of verbs occurring with a particular wh-form and the relative frequency with which questions occurred with that wh-form. Such a measure provides an index of verb use, that represents the relative number of verbs used with a particular wh-form at a given time. This index reflects rates of change when the values are plotted developmentally, as in Figure 3, which presents indices of verb use for each of the 4 children.

Insert Figure 3 about here

For the four children, the indices for what and where questions were relatively low, and remained low across time. This means that the relatively small number of verbs used with what and where forms increased at roughly the same rate as did the frequency of occurrence of what and where questions. Hence the functions for what

and where were always relatively low and stable, indicating that the increase in what and where-questions matched the increase in the use of different verbs. However, what and where questions decreased over time relative to the occurrence of other wh-questions.

The later emerging wh-forms initially had relatively high indices, which decreased over time. The initially high indices for the later emerging wh-forms indicate that, early on, such questions occurred relatively infrequently but were used with a variety of different verbs. Over time, however, the frequency of who, how, and why questions increased at a greater rate than did the number of different verbs used with these forms. For the four children then, later learned wh-forms were learned with more different verbs than were the earlier emerging questions forms. And while all children came to ask more questions with the later emerging forms, their use of an increasing number of verbs with these forms did not proceed at the same rate.

Thus, it appears that complications involved with learning wh-questions arise, in part, from both the syntactic function of a particular wh-form and from the semantics of more specific verbs. The earliest learned wh-question forms (what, where, who) were used overwhelmingly with the copula or the pro-verbs do and go. Since what, where, and who are wh-pronominals that stand for major sentence constituents, they can be combined more easily with the copula and proverbs such as do or go, without the child having to sort out the individual semantic and syntactic constraints between different nouns and descriptive verbs. In contrast, why, how, and

when are wh-sententials that do not replace major sentence constituents. They were used with descriptive verbs primarily; they were acquired later; and they increased in frequency at a faster rate than the number of different descriptive verbs with which they occurred.

Developmental Progression of Descriptive Verb Use

There were three patterns in the progression of the use of verbs with particular wh-questions over time: (1) exclusive verbs were used with only one wh-questions form throughout the developmental period; (2) successive verbs were used first with one and then another question form; and (3) overlapping verbs were used with more than one question form at the same time. The proportion of descriptive verbs that followed each of these patterns of progression is presented in Table 2. The majority of the verbs were exclusive

---

Insert Table 2 about here

---

verbs that were used with only one question form. For three of the children, successive verbs were next most frequent, and overlapping verbs that were used with more than one question form at the same time were rare. Thus, not only were the questions that developed later in the sequence (why, how, when) used primarily with descriptive verbs, but the descriptive verbs that occurred were restricted in their occurrence with more than one different wh-form.

Distribution of Verb Ellipsis

There were also questions that occurred without verbs, and such questions without verbs accounted for .25 of the children's

questions throughout the period of study. One might expect such questions without verbs to be more frequent in the early samples, and to decline as the children learned to use more different verbs. In fact, however, even though the children did learn to use more different verbs over time, there were also clear developmental patterns in the motivated, systematic deletion of verbs in discourse contexts.

Wh-questions without verbs were of two kind: (1) elliptical questions, both single-word elliptical questions such as "what?," "why?," and multi-word elliptical questions without verbs such as "what book?," and (2) incomplete questions, where the verb was obligatory in the adult model but not used in the child's utterance, such as "what that?" or "where dog?" There was an increase over time in those questions which were elliptical, and a decrease in incomplete questions. The proportion of questions with verb ellipsis at two-month intervals is presented in Table 3, for each question form, and for all questions combined. The four most frequent questions--

Insert Table 3 about here

what, where, why, and who showed the most consistent and the greatest increase in verb ellipsis. This result suggests that discourse factors play an important role in the development of children's questions.

Those elliptical wh-questions without verbs that increased over time, such as "what man?" or "why not?" were necessarily contingent on a previous utterance by someone else; they are what Garvey (1975)

has called "contingent queries." A contingent query is evidence that the child has processed the information in a prior message and understood that certain information is still missing for full understanding; the contingent query asks for that missing information. The developmental increase in contingent queries indicated that the children were learning how to question specific information in prior messages. The absence of verbs in contingent queries was motivated by discourse requirements for ellipsis. In a previous study, Bloom, Rocissano and Hood (1976) found change from non-contingent to contingent utterances--both questions and non-questions combined--in the speech of the same four children from two to three years of age. The finding here is consistent with those of that study, and reflects the child's increasing ability to take what another speaker is saying into account, in formulating messages. In contrast, the incomplete wh-question, without verbs, such as "what that?," were evidence of immaturity; they decreased developmentally as the children learned more of the formal requirements for asking questions.

To conclude, the results of this study suggest that the relative cognitive complexity of different wh-question forms alone cannot account for their order of acquisition. In fact, in a related study of the same four children, the homonymous form when emerged as a syntactic connective to encode temporal meaning relations in complex sentences at 32 months. Thus, the fact that the children did not use when productively as a question form even at 36 months was not a function only of cognitive limitations. Rather, there appear to be important linguistic constraints as well that operate to determine the developmental sequence of wh-questions.

The semantics of verbs, the syntactic function of the wh-form, and the requirements of discourse are integrated and operate together, in complex interaction with one another and, no doubt, with other factors still to be identified, to influence when and how children learn to ask wh-questions.

References

Bloom, L., L. Rocissano, and L. Hood. Adult-child discourse: Developmental interaction between information processing and linguistic knowledge. Cognitive Psychology, 1976, 8, 521-552.

Brown, R. The development of wh-questions in child speech. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 279-290.

Ervin-Tripp, S. Discourse agreement: How children answer questions. In J. Hayes (Ed.), Cognition and the Development of Language. New York: Wiley, 1970.

Felix, S. Wh-pronouns and second language acquisition. Linguistische Berichte, 1976, 44, 52-64.

Garvey, D. The contingent query: A dependent act in conversation. In M. Lewis and L. Rosenblum (Eds.), Interaction, Conversation, and the Development of Language: The Origins of Behavior. Vol. 5, New York: John Wiley & Sons, 1977.

Lightbown, P.M. Question form and question function in the speech of young French L_2 learners. In M. Paradis (Ed.), Aspects of bilingualism. Columbia, S.C.: Hornbeam Press, 1978.

Smith, M. The influence of age, sex and situation on the frequency, form and function of questions asked by preschool children. Child Development, 1933, 4, 201-381.

Tyack, D. and D. Ingram. Children's production and comprehension of questions. Journal of Child Language, 1977, 4, 211-224.

Figure 1

DEVELOPMENTAL RANK ORDER OF WH-QUESTIONS

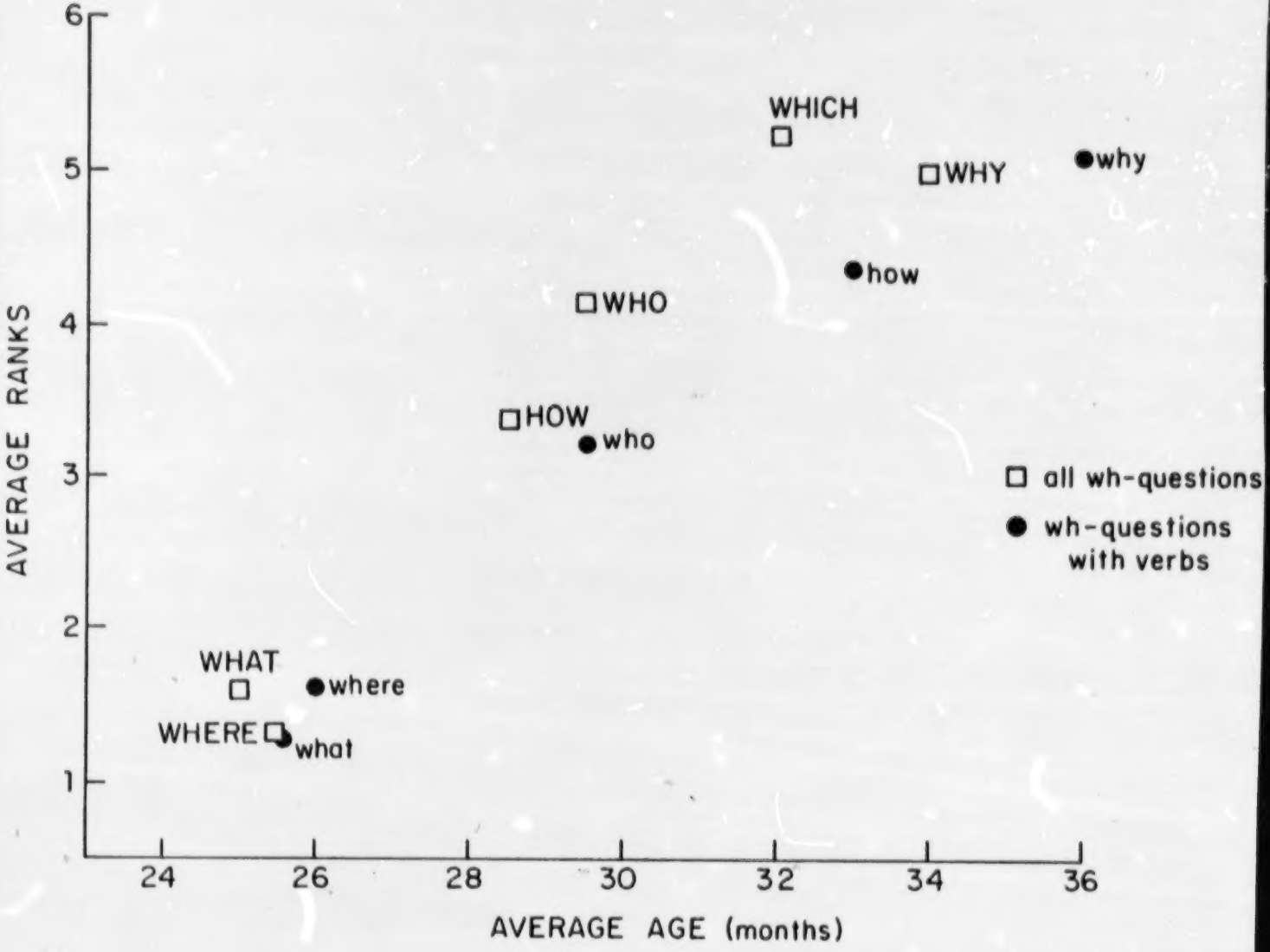
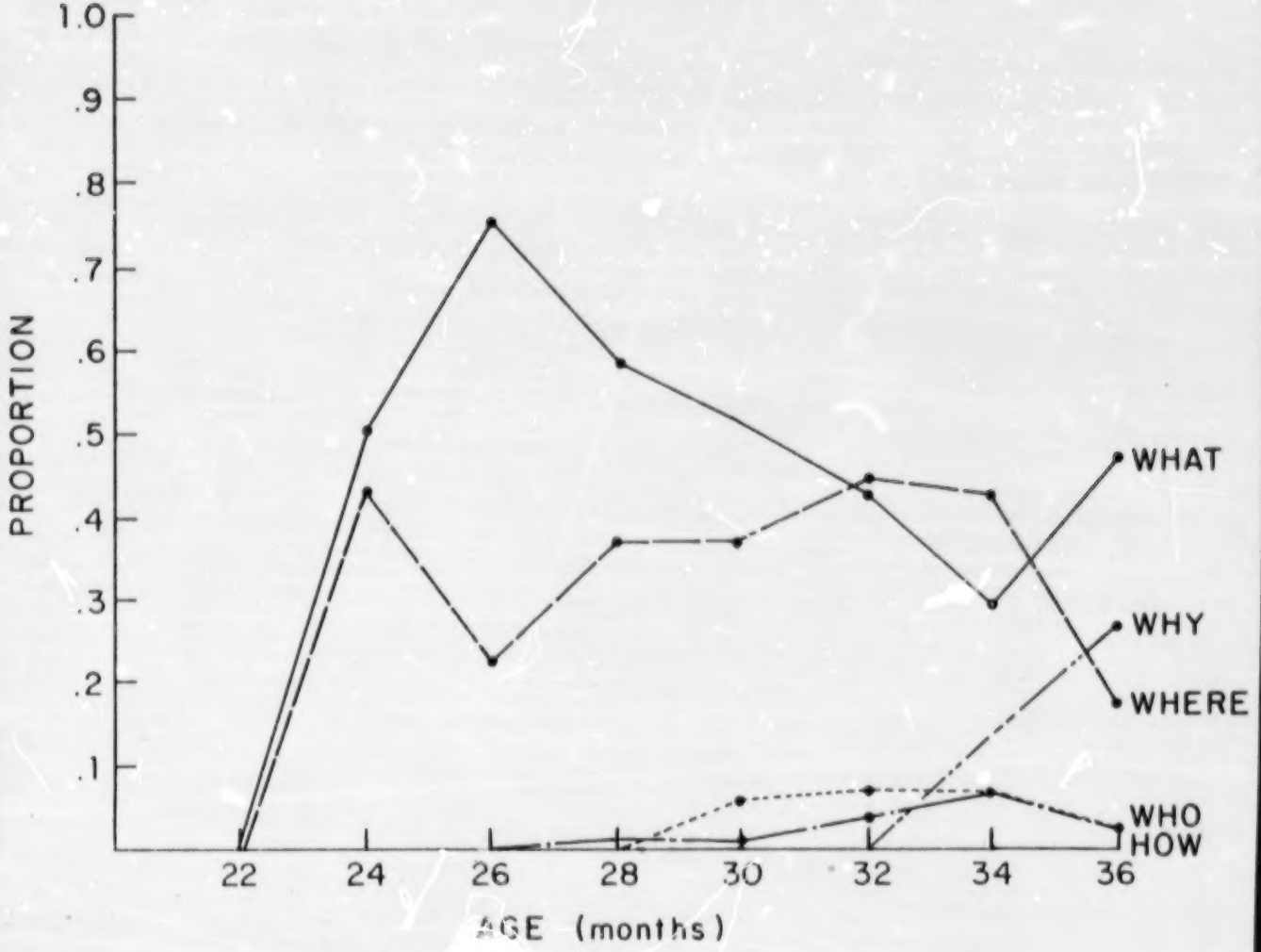


Figure 2

RELATIVE DISTRIBUTION OF WH-QUESTIONS WITH VERBS ACCORDING TO WH-FORM



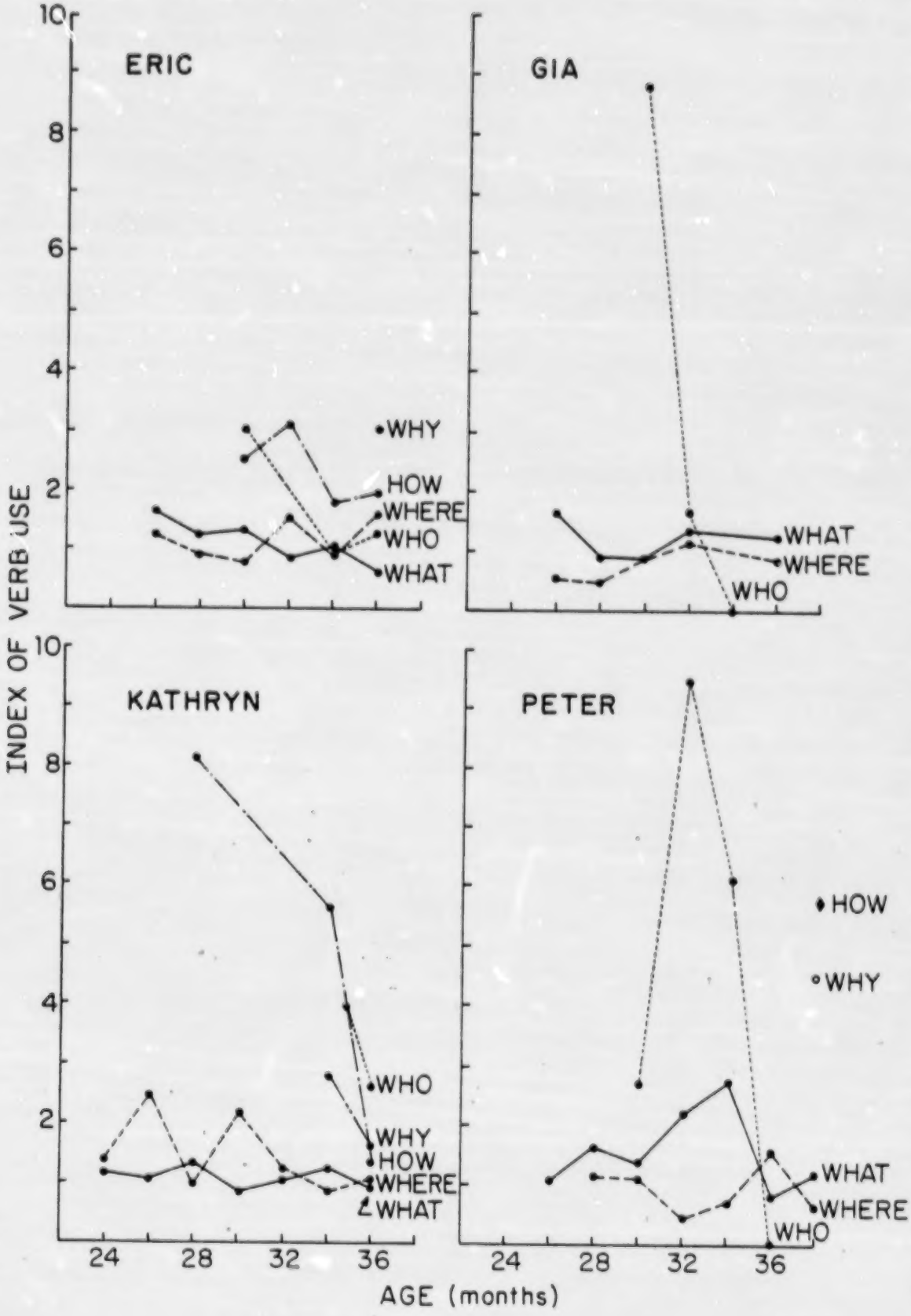

ERIC
GIA
KATHRYN
PETER
INDEX OF VERB USE
AGE (months)
WHY
HOW
WHERE
WHO
WHAT
10
8
6
4
2
24
28
32
36

Figure 3 .8

Table 1

DISTRIBUTION OF DESCRIPTIVE VERBS AND PRO-VERBS ACCORDING TO WH-FORM

	WHAT	WHERE	WHO	HOW	WHY	WHICH	WHEN	WHOSE	TOTAL
COPULA AND PRO-VERBS	1773 (.85)	1202 (.92)	100 (.66)	53 (.53)	78 (.26)	5 (.36)	2 (.22)	6 (.86)	3219 (.81
DESCRIPTIVE VERBS	316 (.15)	99 (.08)	51 (.34)	47 (.47)	225 (.74)	9 (.64)	7 (.78)	1 (.14)	755 (.19
TOTAL	2089 (.53)	1301 (.33)	151 (.04)	100 (.03)	303 (.08)	14 (.004)	9 (.002)	7 (.001)	3974

Table 2

Patterns of Progression

in the Use of Descriptive Verbs Over Time

	Exclusive Use (Verbs used with only one wh-form)	Successive Use (Verbs used with different wh-forms at different times)	Overlapping Use (Verbs used with more than one wh-form at the same time)
Eric	.70	.22	.06
Gia	.78	.00	.22
Kathryn	.64	.30	.06
Peter	.78	.18	.06

Table 3

Proportion of Wh-Questions with Verb Ellipsis

Age	Wh-Question Form						
(months)	what	where	why	how	who	which	All Wh-Question Forms Combined
22	-	-	-	-	-	-	-
24	0	-	-	-	-	-	.02
26	.01	.01	-	.88	0	.75	.04
28	.01	.01	-	.58	0	-	.04
30	.12	.01	.43	.54	.08	.67	.09
32	.12	.05	.43	.44	0	.05	.11
34	.32	.02	.43	.43	.11	-	.22
36	.39	.16	.39	.35	.19	.81	.36
38	.33	.18	.78	.62	.57	-	.39